

**What Is Claimed Is:**

1. An apparatus for inputting characters and numerals to a display of a mobile communication system for use with communication with another user or data storage,  
5 the apparatus comprising:

a keypad having a plurality of buttons and consonants and vowels of each language out of Korean, Roman, Japanese and Chinese, numerals, functional keys allocated in at least four sliding directions, and generating a key signal according to the button operation of a user who wants to input a character or a numeral, and the sliding  
10 motion of the keypad in at least four directions centering around a the user within a main body of the mobile communication terminal;

a character storage for storing character data of each language supported by the mobile communication terminal;

a program memory for storing an internal operating program of the mobile  
15 communication terminal;

a code storage for storing code data corresponding to the buttons arranged on the keypad and the sliding directions of the keypad;

a button-operation recognition unit for detecting a key operating state of each of the buttons on the keypad;

20 a keypad sliding recognition unit for detecting a key operating state according to the sliding motion of the keypad in at least four direction;

a microprocessor, driven by the operating program in the program memory in response to a key operation state detection signal inputted through the button-operation recognition unit and/or the keypad sliding recognition unit, for deciding with reference  
25 to the character data in the character storage which phoneme of what language the user inputs, generating a display control signal for displaying the phoneme of the corresponding language referring to the code data in the code storage, and outputting the phoneme;

a display driving unit, under a display control signal outputted from the  
30 microprocessor, for outputting a driving control signal displaying a character and a numeral the user selects by pressing a button on the keypad or sliding the keypad in a desired direction; and

a display, under the driving control signal outputted from the display driving unit, for displaying on a screen the character and the numeral the user selects.

2. The apparatus according to claim 1, wherein if the keypad is a Korean alphabet keypad, Korean consonants are allocated to each of the buttons on the keypad, and Korean vowels are allocated in at least four sliding directions of the keypad.

3. The apparatus according to claim 2, wherein the Korean vowels allocated in at least four sliding directions of the keypad are ㅣ, ㅑ, ㅓ, ㅡ, ㅗ, ㅜ, ㅝ, and ㅛ, each being disposed in upper left, upward, upper right, left, right, lower left, downward, and lower right directions, respectively.

4. The apparatus according to claim 2, wherein the Korean vowels allocated in at least four sliding directions of the keypad are inputted by pressing a button once, twice and for long, and by sliding the keypad in a desired direction.

5. The apparatus according to claim 1, wherein if the keypad is a Roman alphabet keypad, two Roman alphabets are allocated to each of the buttons on the keypad, and vowels/consonants, special characters and functional keys are allocated in at least four sliding directions of the keypad.

6. The apparatus according to claim 5, wherein the vowels/consonants allocated in at least four sliding directions of the keypad are A, E, I, O, U, W, and Y, each being disposed in upper left, upward, upper right, left, right, lower left, and lower right directions, respectively; and if the user slides the keypad in the downward direction while pressing a corresponding button a second alphabet on the right hand side of a button is inputted.

7. The apparatus according to claim 5, where the combination of alphabets written on each of the buttons on the keypad and allocated in at least four sliding directions of the keypad comprises the following steps of:

if the user presses a button on the keypad and slides the keypad while pressing

the button, a first alphabet on the corresponding button and an alphabet allocated in the sliding direction of the keypad are inputted simultaneously; and

if the user slides the keypad by using the frictional force of the user's hand without pressing any button on the keypad beforehand and presses a button on the keypad thereafter, a second alphabet on the button and an alphabet allocated in the sliding direction of the keypad are inputted simultaneously.

8. The apparatus according to claim 1, wherein if the keypad is a Japanese alphabet keypad, あs are allocated to each of the buttons on the keypad, and い, う, え, お/special characters or functional keys are allocated in at least four sliding directions of the keypad.

9. The apparatus according to claim 8, wherein voiced sound, long sound, Chinese, and Hiragana/Katakana conversion are allocated to the rest of the buttons where あs are not allocated.

10. The apparatus according to claim 10, wherein to input 'ん', the user presses a corresponding button on the keypad one more time;

to input 'っ', the user slides the keypad in a sliding direction where う is allocated and presses a button with 'た' on the keypad for long;

to input a semivowel among 'や, ゆ, and よ', the user presses a button with 'ゃ' or slides the keypad while pressing the button with 'ゃ', inputs 'や, ゆ, and よ', and then presses the corresponding button for long;

to input a semi-voiced sound, the user inputs a character in the row of 'は' and presses a corresponding button for long; and

to express 'f' sound in Japanese, such as 'フ, イ, エ and オ' marked after the 'フ', the user inputs a character in the row of 'フ' and presses a corresponding button for long.

11. A method for inputting characters and numerals to a display of a mobile communication terminal, the method comprising the steps of:

(1) at a microprocessor of the mobile communication terminal, deciding which

language alphabet mode is selected by a user;

(2) at the microprocessor of the mobile communication terminal, deciding the language alphabet mode the user selected is one of Korean input mode, Roman input mode, and Japanese input mode;

5 (3) if the user selects the Korean input mode, detecting, in the microprocessor, a key signal inputted from a button-operation recognition unit and/or a keypad sliding recognition unit in accordance with the operation of a plurality of buttons on a keypad or the sliding operation of the keypad in upward, downward, left, right and diagonal directions, combining Korean consonant and vowels and numerals/symbols, and  
10 displaying a result thereof on a screen of the mobile communication terminal;

(4) if the user selects the Roman input mode, detecting, in the microprocessor, a key signal inputted from the button-operation recognition unit and/or the keypad sliding recognition unit in accordance with the operation of a plurality of buttons on the keypad or the sliding operation of the keypad in upward, downward, left, right and diagonal  
15 directions, combining consonant and vowels and numerals/symbols, and displaying a result thereof on the screen of the mobile communication terminal;

(5) if the user selects the Japanese input mode, detecting, in the microprocessor, a key signal inputted from the button-operation recognition unit and/or the keypad sliding recognition unit in accordance with the operation of a plurality of buttons on the  
20 keypad or the sliding operation of the keypad in upward, downward, left, right and diagonal directions, combining Hiragana, Katakana, Chinese and numerals/symbols, and displaying a result thereof on the screen of the mobile communication terminal;

(6) if a character input process in one of the input modes including the Korean input mode, the Roman input mode and the Japanese input mode is complete, deciding,  
25 in the microprocessor, whether the user selects a key signal for storing the input characters, and storing the input characters according to the user's selection; and

(7) at the microprocessor, maintaining or ending the character mode according to the user's selection whether to end the character mode or not.

30 12. The method according to claim 11, wherein if the user selects the Korean input mode, the step (3) comprises the sub-steps of:

(3-1) at the microprocessor of the mobile communication terminal, converting a

mode into the Korean input mode,

(3-2) at the microprocessor, deciding whether the user operates a menu key;

(3-3) after the user operates the menu key, performing, in the microprocessor, the menu selected from character cancel, blank character output, numeral and symbol input, and line change menus, and repeating the procedure after the step (3-2);

(3-4) if the user does not select any menu key, deciding, in the microprocessor, whether the user inputs consonants and vowels by pressing the buttons on the keypad and/or sliding the keypad in the upward, downward, left, right and diagonal directions;

(3-5) if the user presses the buttons on the keypad and/or slides the keypad in the upward, downward, left, right and diagonal directions, checking, in the microprocessor, the input of Korean consonants and monophthongs;

(3-6) if the user presses the buttons on the keypad and/or slides the keypad in the upward, downward, left, right and diagonal directions, checking, in the microprocessor, the input of Korean consonants and diphthongs; and

(3-7) displaying on a display Korean words obtained by combining the Korean consonant, monophthongs and diphthongs, and repeating the procedure after the step (3-2).

13. The method according to claim 12, wherein the step (3-5) comprises the sub-steps of:

(3-5-1) at the microprocessor, deciding whether a (Korean alphabet) button on the keypad is pressed down by the user;

(3-5-2) if the button is being pressed down, deciding, in the microprocessor, whether the keypad is slid in a direction and a certain vowel along the direction is selected by the user;

(3-5-3) if the user selects the vowel in the sliding direction of the keypad, deciding, in the microprocessor, whether one consonant and one vowel are selected;

(3-5-4) if one consonant and one vowel are selected by the user, deciding, in the microprocessor, whether the user selects the consonant button again;

(3-5-5) if the consonant button is selected again, combining, in the microprocessor, the corresponding consonant and a diphthong;

(3-5-6) in the microprocessor, deciding whether the Korean letter the user

inputted is a complete form of Korean and if so, performing the step (3-7);

(3-5-7) if the Korean letter the user inputted is not a complete form of Korean, outputting, in the microprocessor, the corresponding consonant only assuming that the user inputted the consonant only, and performing the step (3-7);

5 (3-5-8) if a certain vowel allocated in a sliding direction of the keypad is not selected, deciding, in the microprocessor, whether the corresponding button is being pressed for long;

(3-5-9) if the button is pressed for long, recognizing, in the microprocessor, the corresponding consonant as a fortis and performing the procedure after the step (3-5-1);

10 (3-5-10) if one consonant and one vowel are not selected in the step (3-5-3), deciding, in the microprocessor, whether the user selects one consonant and two vowels by sliding the keypad; and

(3-5-10) if one consonant and two vowels are selected, recognizing, in the microprocessor, the two vowels as vowels allocated to a corresponding diagonal  
15 direction of the keypad and performing the procedure after the step (3-5-4); and if one consonant and two vowels are not selected, performing the procedure after the step (3-5-6).

14. The method according to claim 12, wherein the step (3-6) comprises the sub-  
20 steps of:

(3-6-1) at the microprocessor, deciding whether the user slides the keypad by using the frictional force of a hand while no button on the keypad is being pressed;

(3-6-2) if the user slides the keypad and selects a particular vowel along the direction, deciding, in the microprocessor, whether the user presses a button on the  
25 keypad to input a consonant;

(3-6-3) if the consonant is selected, deciding, in the microprocessor, whether the vowel and the consonant the user selects are being pressed;

(3-6-4) if the consonant and the vowel the user selects are pressed, deciding, in the microprocessor, whether the consonant button is selected one more time;

30 (3-6-5) if the consonant button is selected one more time, combining, in the microprocessor, the corresponding button and a diphthong;

(3-6-6) at the microprocessor, whether the Korean letter the user inputted is a

complete form of Korean and if the Korean letter is a complete form of Korean performing the step (3-7), and if not a complete form of Korean repeatedly performing the procedure after the step (3-2);

5 (3-6-7) if the vowel is not selected by the user in the step (3-6-1), deciding, in the microprocessor, whether the user selects two vowels instead of one by sliding the keypad;

(3-6-8) if the user selects two vowels by sliding the keypad, recognizing, in the microprocessor, the vowels as vowels in a corresponding diagonal direction of the keypad, and performing the procedure after the step (3-6-2);

10 (3-6-9) if the consonant is not selected, deciding, in the microprocessor, whether the user selects a '\*' button;

(3-6-10) if the '\*' button is selected, deciding, in the microprocessor, whether two vowels are being pressed down;

15 (3-6-11) if two vowels are pressed, recognizing, in the microprocessor, the two vowels as vowels in a corresponding diagonal direction of the keypad;

(3-6-12) at the microprocessor, outputting the corresponding vowel exclusively according to whether the user selects the '\*' button once or twice, and performing the procedure after the step (3-2);

20 (3-6-13) if the particular button on the keypad is not selected again, deciding, in the microprocessor, whether the user presses the button for long; and

(3-6-14) if the corresponding button is pressed for long, recognizing, in the microprocessor, the corresponding consonant as a fortis, and performing the procedure after the step (3-6-6).

25 15. The method according to claim 11, wherein the step (4) comprises the sub-steps of:

(4-1) at the microprocessor of the mobile communication terminal, converting a mode into the Roman input mode

(4-2) at the microprocessor, deciding whether the user operates a menu key;

30 (4-3) after the user operates the menu key, performing, in the microprocessor, the menu selected from character cancel, blank character output, numeral and symbol input, and line change menus, and repeating the procedure after the step (4-2);

(4-4) if the user does not select any menu key, checking, in the microprocessor, whether the user inputs Roman consonants and vowels by pressing the buttons on the keypad and/or sliding the keypad in the upward, downward, left, right and diagonal directions;

5       (4-5) if the user presses the buttons on the keypad and/or slides the keypad in the upward, downward, left, right and diagonal directions, checking, in the microprocessor, the input of Roman consonants and vowels on the left hand sides of the buttons and in the sliding directions of the keypad;

10       (4-6) if the user presses the buttons on the keypad and/or slides the keypad in the upward, downward, left, right and diagonal directions, checking, in the microprocessor, the input of consonants and vowels on the right hand sides of the buttons and in the sliding directions of the keypad; and

15       (4-7) displaying on a display Roman words obtained by operating the consonants on the left and right hand sides of the buttons, and repeating the procedure after the step (4-2).

16.     The method according to claim 15, wherein the step (4-5) comprises the sub-steps of:

20       (4-5-1) at the microprocessor of the mobile communication terminal, deciding whether a particular button on the keypad is pressed down by the user (S451);

      (4-5-2) if the button is pressed down, deciding, in the microprocessor, whether the keypad is slid in any direction and a certain character along the direction is selected;

25       (4-5-3) if the user selects the character by sliding the keypad, deciding, in the microprocessor, whether the button the user selected is continuously pressed down and the keypad maintains the slid state thereof;

      (4-5-4) if the button the user selected is continuously pressed down and the keypad maintains the slid state thereof, combining, in the microprocessor, a Roman alphabet on the left hand side of the corresponding button and a Roman alphabet allocated in the sliding direction of the keypad, and performing the step (4-7);

30       (4-5-5) if the particular alphabet in the sliding direction of the keypad is not selected, deciding, in the microprocessor, whether a particular button on the keypad is pressed by the user for long;



(4-5-6) if the particular is pressed by the user for long, recognizing, in the microprocessor, the corresponding alphabet, as a capital letter and repeatedly performing the procedure after the step (4-5-1);

5 (4-5-7) if in the step (4-5-5) the corresponding button is not pressed for long, deciding, in the microprocessor, whether the user operates a key for outputting a right hand side alphabet instead on the corresponding button;

(4-5-8) if the user operates the key for outputting the right hand side alphabet on the corresponding button, outputting, in the microprocessor, the right hand side alphabet, and repeatedly performing the procedure after the step (4-2);

10 (4-5-9) if the button the user selected is not pressed and the slid state of the keypad is not maintained, deciding, in the microprocessor, whether an additional alphabet allocated in the corresponding sliding direction of the keypad is selected; and

(4-5-10) if the user selects the additional particular alphabet in the corresponding sliding direction of the keypad, recognizing, in the microprocessor, the  
15 alphabet as a vowel allocated in a corresponding diagonal sliding direction of the keypad, and repeatedly performing the procedure after the step (4-5-4).

17. The method according to claim 15, wherein the step (4-6) comprises the sub-steps of:

20 (4-6-1) at the microprocessor, deciding if the keypad is slid by the frictional force of the user's hand while no button is pressed, and a particular alphabet is selected thereby;

(4-6-2) if the particular alphabet is selected by the sliding motion of the keypad, deciding, in the microprocessor, whether the user presses a certain button on the keypad  
25 to input an alphabet thereon;

(4-6-3) if the button on the keypad is operated, deciding, in the microprocessor, whether the corresponding button is pressed by the user for long;

(4-6-4) if the corresponding button is pressed by the user for long, recognizing, in the microprocessor, the corresponding alphabet as a capital letter;

30 (4-6-5) at the microprocessor, outputting the capital letter and performing the step (4-7);

(4-6-6) if the keypad is not slid by the user and thus no alphabet is selected in

the step (4-6-1), deciding, in the microprocessor, whether the user selects two alphabets instead of one by sliding the keypad; and

(4-6-7) if the user selects two alphabets by sliding the keypad, recognizing, in the microprocessor, the two characters as vowels allocated in a corresponding diagonal sliding direction of the keypad, and performing the procedure after the step (4-6-2).

18. The method according to claim 11, wherein the step (5) comprises the sub-steps of:

(5-1) at the microprocessor of the mobile communication terminal, converting a mode into the Japanese input mode

(5-2) at the microprocessor, deciding whether the user operates a menu key;

(5-3) after the user operates the menu key, performing, in the microprocessor, the menu selected from character cancel, blank character output, numeral and symbol input, and line change menus, and repeating the procedure after the step (5-2);

(5-4) if the user does not select any menu key, checking, in the microprocessor, whether the user inputs Hiragana, Katakana, and Japanese combined with Chinese by pressing the buttons on the keypad and/or sliding the keypad in the upward, downward, left, right and diagonal directions; and

(5-5) at the microprocessor, displaying on a display Japanese words composed of Hiragana, Katakana, and Japanese combined with Chinese the user inputted by pressing the buttons on the keypad and/or sliding the keypad, and repeatedly performing the procedure after the step (5-2).